Liver Fluke

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Dumfries

*SAC Consulting is a division of SRUC*

*Leading the way in Agriculture and Rural Research, Education and Consulting*
Fluke requirements

- Snails
- Water
- Temperatures >10°C
- Sheep, cattle, deer, rabbits, horses, man

Fluke Lifecycle

- May
- July
- September
- October
- December
- December On
Immature and Adult Fluke
Normal Liver

Acute/Subacute Fluke
Fluke Lifecycle

MAY

JULY

SEPTEMBER

GRASS

OCTOBER

LIVER

DECEMBER

DECEMBER ON

Chronic Fluke
Chronic Fluke (Subclinical)

Other problems

- High barren rates and abortions
- Deaths due to clostridial disease
- Deaths when handled for treatment
- Deaths due to liver failure after successful treatment
- Metabolic disease
- Acute fluke deaths of sheep wintering on dairy farm
- TREATMENT FAILURES
Other losses

- Reduction in milk yields
- Increased deaths of young lambs
- Poor lamb growth rates
- Poor store cattle weights
- Increased time for cattle to finish (+8%)
- Death of suckled calves due to chronic fluke
- Downer suckler cows
- Liver condemnation at abattoirs
- Treatment costs including time

Fluke Lifecycle

- MAY
- JULY
- SEPTEMBER
- OCTOBER
- DECEMBER
- DECEMBER ON
Fluke egg

Test Timeline

<table>
<thead>
<tr>
<th>Weeks after infection</th>
<th>PCR</th>
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<tbody>
<tr>
<td>2</td>
<td>Liver enzymes (blood)</td>
</tr>
<tr>
<td></td>
<td>Blood antibodies</td>
</tr>
<tr>
<td>4</td>
<td>Coproantigen</td>
</tr>
<tr>
<td>6</td>
<td>Fluke egg count</td>
</tr>
<tr>
<td>8</td>
<td></td>
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<td>10</td>
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<td>12</td>
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Snail Habitats
Barony Field Map

Loch Field
Good Snail Habitats

Mid September

• All sheep on farm last fluked in January.
• Cows/calves usually housed mid November.
• Lambs should all be fat in less than 6 weeks.
• Summer rainfall slightly above average.
• (Cows and calves, ewes, purchased gimmers, fat lambs.)
Barony Field Map

Hoggs

In calf heifers

Jubilee Field - Hoggs
Trial Field – In Calf Heifers

Blood Antibody Results (21/11/14)

- Heifers – 100% positive.
- Hoggs – 20% positive.
Fluke Lifecycle

- MAY
  - JULY
  - SEPTEMBER
  - OCTOBER
  - DECEMBER

  WILDLIFE
  - GRASS
  - LIVER
  - DECEMBER ON

Choice of product
Choice of product

- Products vary in their ability to kill fluke
- Time of year
- Age of fluke present in liver
- Withdrawal period
- Method of administration
- Is a worming dose also required?
- What has been used in the past?
- Did it work?
EWES LAMBING OUTSIDE IN MAY

TUPS IN OCTOBER
(No resistance to Triclabendazole diagnosed)

SUCKLER COWS
8 WEEKS AFTER HOUSING

SUPLACINX

FASIMEC DUO

ANIMEC SUPER

TRODAX

RYCOBEN

EWES IN OCTOBER
(Triclabendazole resistance diagnosed)

PURCHASED SIMMERS IN LATE SEPTEMBER
(Came from a very wet area)

DAIRY COWS AT DRYING OFF IN FEBRUARY
(Housed mid October)

FLUKIVER

CLOSAMECTIN INJECTION

COMBINEX

FASINEX 5%

CYDECTIN TRICLAMOX POUR ON

ZANIL

ALBEX 10%

TRICLAFAS 5%

Pick a Product
Assess Fluke Risk

- Where have they grazed particularly from August on?
- What grazed these fields earlier in the year?
- Sheep?
- Re-seeds, silage fields?
- Are there wet areas, could there be snails?
- Was the summer wet or dry?
- Likely date of housing?
- Problems in previous years?
- Any signs of ill health/poor production that could be due to fluke?

When To Treat?

![Diagram showing the distribution of sheep acute fluke deaths by month, with bars representing low, medium, and high risk cases.](image-url)
When to treat?

• Fluke treatments are not long acting

• Sheep - October, January and late spring/early summer.
  • High risk years/farms – as above plus extra treatments 4-6 weeks after the October and January doses.
  • Extreme years on wet farms - ? Every 4 weeks in autumn, ?treat and house.

When to treat?

• Beef cattle - treat at appropriate interval after housing (?plus at housing in high risk years/farms)
  • Outwintered cattle - treat winter and spring (?3 times in highest risk years)
  • Consider checking for fluke eggs before turn out.

• Useful websites:
  • www.nadis.org.uk
  • www.scops.org.uk
  • www.cows.org.uk
My Stock Were Treated – Why Have The Livers Been Condemned?

- Re-infection
- Inappropriate product used.
- Incorrect timing of treatment.
- Product not expected to kill 100% of fluke in the liver.
- Treatment failure e.g. underdosing, product out of date.
- Treatment failure – resistance.
- Scarring and fibrosis of liver.
- Error.

My Sheep Were Treated Why Are They Still Dying?

- Re-infection – dosing interval too long.
- Inappropriate product used.
- Incorrect timing of treatment.
- Treatment failure e.g. underdosing, product out of date.
- Treatment failure – resistance.
Resistant Fluke

- Resistant fluke survive being exposed to the correct dose of a drug that would normally be expected to kill them.
- They pass this advantage to their offspring via their genes.
- The next generation of fluke are also resistant.

Triclabendazole

- First became available in 1984.
- Now reported in many countries.
- How much is out there?
Checking For Resistance

- Mark and weigh 10 sheep/cattle.
- Collect individually identifiable faecal samples.
- Dose accurately.
- Re-sample 3 weeks later if fluke eggs counts are being carried out, 2 weeks later if coproantigen testing is being carried out.

Quarantine Treatment – Why Bother?

Picture: Dieter Palmer
Quarantine Treatment – Why Bother?

• Any farm - To kill liver fluke and prevent deaths/production losses.

• Farms with snail habitats but no history of liver fluke – To prevent deaths/production losses and prevent liver fluke becoming established on the farm.

• Farms that already have liver fluke – To prevent deaths/production losses and prevent the introduction of liver fluke that are resistant to triclabendazole.

Quarantine Treatment – Why Bother?

• Where have they come from?
• Are they likely to be infected?
• What time of year is it?
• What age of fluke are most likely to be in the liver?
• Have they been treated? What with and when?
• Could collect samples but interpret results with care.

• Treat with triclabendazole and either monitor or treat with closantel or nitroxynil 6 weeks later.
• Treat with closantel or nitroxynil and repeat 6 - 7 weeks later.
• If housed on arrival (and no immediate disease risk) delay treatment for 6 to 8 weeks and treat with closantel or nitroxynil.
• Graze in fields with no snails for as long as possible.
Quarantine Treatment – Why Bother?

• Extra costs and hassle.

• If triclabendazole resistant liver fluke have already been confirmed locally then spread may occur via:
  
  • Movement of wildlife and straying stock.
  • Heavy rainfall may cause flooding across boundaries or wash snails/cysts downstream.
  • Snails could be transported on the feet of birds.

Fluke Forecasts

WHAT ABOUT THIS YEAR?
Fluke Forecasts

• Developed in the 50s and 60s.

• Based on the knowledge that summer weather conditions influence the fluke lifecycle.

• Compared meteorological data with the number of sheep deaths due to acute/subacute fluke.

• Are they still accurate and relevant? Has the disease changed?

Reasons for Developing Fluke Forecasts

• “to assist in a decision to use molluscicides” ❌

• “to design grazing control” ✓

• “to assist in the recommendations for treatment and other forms of fluke control” ✓
Acute/Subacute Fluke - Ayr and Dumfries

Acute Fluke Diagnoses Ayr and Dumfries

Year

Ayr
Dumfries
Scotland West June to September Rainfall and 30 year Averages

Fluke Forecasts – Netherlands Snail Monitoring
SRUC Barony Campus Snail Nos. Mid August

The Future?

- Met. Office climate meeting June 2013: “UK could be in the middle of a 10 to 20 year cycle of wet summers”

- Predicting Impacts of Climate Change on Fasciola hepatica: Fox et al 2011 “Maps show unprecedented levels of future fasciolosis risk in parts of the UK with risk of serious epidemics by 2050”
The Future?

- Since 2012 there is more awareness of liver fluke.
- More research is being carried out.
- Snail control?
- New tests?
- New treatments?
- Vaccination?

Fluke Lifecycle

- May: LIVER
- July: GRASS
- September: WILDLIFE
- October: LIVER
- December: DECEMBER ON
Plan Ahead To Reduce Losses

- Kill adult fluke late spring/early summer.
- Check that triclabendazole is working.
- Assess risk by field.
- Improve, manage or avoid high risk areas.
- Reduce stocking density in autumn.
- Check fluke forecasts.
- Investigate sudden deaths or ill thrift both before and after treatment.
- Treat with an appropriate product for the time of year.
- Quarantine purchased stock.

Grazing Options

- Fence off snail habitats.
- Improve drainage, reduce compaction.
- Remove stock, especially sheep, from high risk fields as soon as possible in late summer/autumn.
Lambs Particularly If High Risk Year/Farm

- Finish or sell as soon as possible.
- Graze on lowest risk fields in autumn.
- Consider grazing on brassicas/chicory.
- House to finish.
- Monitor weight gains.
- Investigate the first death.
- Monitor for infection – antibodies, fluke eggs, abattoir feedback.

Don’t chew the grass!

Apparent Triclabendazole-Resistant Human *Fasciola hepatica* Infection, the Netherlands

Suggested citation for this article

To the Editor: In December 2007, a 71-year-old sheep farmer sought care with a 4-month history of intermittent right upper quadrant pain, night sweats, anorexia, and a 5-kg weight loss. His medical history was unremarkable, and he had not traveled outside the Netherlands for ≈30 years. Physical examination revealed no abnormalities.

Fascioliasis affects millions of humans worldwide (3); however, fascioliasis acquired in the Netherlands has been reported only sporadically (4), even though *F. hepatica* infection in sheep and cattle is prevalent there (5). The patient in this report had not eaten watercress or other aquatic plants and had not ingested ditchwater. However, he had worked in and around ditches on farms in the area, admitted chewing grass sporadically, and might have occasionally ingested vegetables previously fertilized with livestock manure. The patient remains asymptomatic but infected.

Winkelhagen et al, Emerging Infectious Diseases, 6th June 2012, http://dx.doi.org/10.3201/eid1806.111038
Adult Rumen Fluke
1st September

- Milking herd, late pregnant heifers, bulling heifers, dry cows (M, PH, BH, DC).
- Want to house on 20th October.
- Pregnant heifers due to calve from 20th January.
- Dry cows already treated for fluke.
- Summer rainfall above average.
- Deer common on farm.